



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/087,948	03/05/2002	Hiromi Nakanishi	33035M086	5371
441	7590	02/07/2006	EXAMINER	
SMITH, GAMBRELL & RUSSELL, LLP 1850 M STREET, N.W., SUITE 800 WASHINGTON, DC 20036			WANG, QUAN ZHEN	
			ART UNIT	PAPER NUMBER
			2633	

DATE MAILED: 02/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/087,948

Applicant(s)

NAKANISHI ET AL.

Examiner

Quan-Zhen Wang

Art Unit

2633

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 13 January 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 9-30,38-59 and 67-69 is/are pending in the application.
- 4a) Of the above claim(s) 16-30 and 44-59 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 9-15,38-43 and 67-69 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 9-14, 38-43, and 67-69 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim (U.S. Patent US 6,527,458 B2) in view of Ozeki et al. (U.S. Patent US 6,317,242 B1) and further in view of Ochiai et al. (U.S. Patent US 5,647,042).

Regarding claim 9, Kim teaches an optical communication device (figs. 3, 5-6; figs. 2-4) comprising: a circuit board (fig. 6A, 161) having a top surface and a bottom surface (inherent); a bench (fig. 6A, SiOB 162) mounted on the top surface of the circuit board; a laser diode (LD) chip (fig. 3, LD 124) mounted on the bench for generating transmitting light signals; a monitoring photodiode (PD) chip (fig. 3, MPD 123) mounted on the bench for monitoring power of the laser diode; light guides aligned with the laser diode on the bench for guiding light signals from laser diode (column 4, lines 53-64); and a LD-driving IC (electric elements) mounted on the circuit board for realizing the operation of the optoelectronic elements (column 2, lines 54-65). Kim further teaches that the light guide is an optical fiber with a ferrule, and the bench has a V-groove for supporting the fiber (column 6, lines 26-67). The device of Kim differs from the claimed invention in that Kim does not specifically teach that the bench has a larger V-groove for

Art Unit: 2633

supporting the ferrule on a lower step. However, it is well known in the art to make a bench that has a larger V-groove for supporting the ferrule on a lower step, and a smaller V-groove for sustaining a fiber with the ferrule. For example, Ochiai discloses an optical bench (fig. 4, substrate 18) having a larger V-groove (fig. 4, V-groove 18a) for supporting the ferrule (fig. 4, ferrule 16) on a lower step, and a smaller V-groove (fig. 4, V-groove 18b) for sustaining a fiber (fig. 4, fiber 16a) with the ferrule. Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to make a larger V-groove on the bench of Kim to support the ferrule, as it is taught by Ochiai, in order to enhance the connection strength of the optical fiber to the bench. It would be a merely engineering design choice to make marks of designating a spot of the laser diode (LD) on the bench for aligning the laser diode to the optical fiber. The modified device of Kim and Ochiai differs from the claimed invention in that Kim and Ochiai do not specifically teach an auto power controlling IC mounted on the bottom surface of the circuit board for controlling the power of the laser diode, and one of the electric elements is just below the bench having the LD chip and the PD chip. However, it is a common sense to mount controlling electric elements on both the bottom surface and the top surface of a circuit board of an optical transceiver. For example, Ozeki discloses to mount electronic or electric elements (fig. 1, electronic elements 41) on both the bottom surface and the top surface of a circuit board (fig. 1, circuit board 40) of an optical transceiver, and one of the electric elements is just below the bench having the LD chip and the PD chip. Therefore, it would have been obvious for one of ordinary skill in the art at the time

when the invention was made to mount electric elements, including a well known APC IC, on the bottom surface of the circuit board and one of the electric elements is just below the bench having the LD chip and the PD chip, as it is taught by Ozeki, in the modified device of Kim and Ochiai in order to reduce the size of the circuit board.

Regarding claims 10 and 39, the bench whether has marks designating a spot of mounting the monitoring photodiode (PD) and the pre-amplifier or not would be merely an engineering design choice.

Regarding claims 11 and 40, the modified system of Kim and Ozeki differs from the claimed invention in that Kim and Ozeki do not specifically teach that the PD is a bottom incidence type PD and the light is coupled to the PD by a groove. However, the Examiner takes Official notice that a bottom incidence type PD is well known in the art. Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to incorporate a bottom incidence type PD and couple light to the PD by a groove as an alternative engineering design choice.

Regarding claims 12 and 41, Kim further teaches that the ferrule is capped with a receptacle for coupling to an external optical connector (for example, fig. 4, ferrule 159).

Regarding claims 13 and 42, Kim further teaches to form V-groove one the silicon bench. To form V-grooves on the bench by anisotropic chemical etching is merely an engineering design choice.

Regarding claims 14 and 43, R/C elements are well known in the art. Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to mount R/C elements on the bottom surface of the circuit board.

Regarding claim 15, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to have the top surface of the circuit board with a set of outward extending leadpins which are connected to wiring moralized patterns formed on the top surface and the bottom surface of the circuit board with another set of outward extending leadpins which are connected to wiring moralized patterns formed on the bottom surface in order to wire up the electronic elements on the board.

Regarding claim 38, Kim teaches an optical communication device (figs. 3, 5-6; figs. 2-4) comprising: a circuit board (fig. 6A, 141) having a top surface and a bottom surface (inherent); a bench (fig. 6A, SiOB 163) mounted on the top surface of the circuit board; a photodiode (PD) chip (fig. 3, PD 122) mounted on the bench for generating transmitting light signals; light guides aligned with the photodiode on the bench for guiding the receiving signals (fig. 3, 125 and 126); a pre-amplifier-driving IC (electric elements) mounted on the circuit board for pre-amplifying the signal of the photodiode (column 5, lines 44-53), wherein the light guide is an optical fiber with a ferrule. The device of Kim differs from the claimed invention in that Kim does not specifically teach that the bench has a larger V-groove for supporting the ferrule on a lower step. However, it is well known in the art to make a bench that has a larger V-groove for supporting the ferrule on a lower step, and a smaller V-groove for sustaining a fiber with the ferrule. For example, Ochiai discloses an optical bench (fig. 4, substrate 18) having a larger V-groove (fig. 4, V-groove 18a) for supporting the ferrule (fig. 4, ferrule 16) on a lower step, and a smaller V-groove (fig. 4, V-groove 18b) for sustaining a fiber (fig. 4,

Art Unit: 2633

fiber 16a) with the ferrule. Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to make a larger V-groove on the bench of Kim to support the ferrule, as it is taught by Ochiai, in order to enhance the connection strength of the optical fiber to the bench. It would be a merely engineering design choice to make marks of designating a spot of the laser diode (LD) on the bench for aligning the laser diode to the optical fiber. The modified device of Kim and Ochiai differs from the claimed invention in that Kim and Ochiai do not specifically teach an auto power controlling IC mounted on the bottom surface of the circuit board for controlling the power of the laser diode. However, it is a common sense to mount controlling electric elements on both the bottom surface and the top surface of a circuit board of an optical transceiver. For example, Ozeki discloses to mount electronic or electric elements (fig. 1, electronic elements 41) on both the bottom surface and the top surface of a circuit board (fig. 1, circuit board 40) of an optical transceiver. Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to mount electric elements, including a well known APC IC, on the bottom surface of the circuit board, as it is taught by Ozeki, and it would be a merely engineering design choice to place one of the electric element on the bottom or the APC IC just below the bench having the LD chip and the PD chip in the modified device of Kim and Ochiai in order to reduce the size of the circuit board.

Regarding claims 67-69, Kim and Ozeki have been discussed above with regards to claims 8-15 and 37-43. Kim further teaches a package for sealing the LD and PD modules (column 2, lines 31-44).

### ***Response to Arguments***

3. Applicant's arguments filed January 13, 2006 have been fully considered but they are not persuasive.

Applicant argues that "an electric element "is just below the bench having the LD chip and the PD chip" on the bottom of the circuit board. However, the term "just below" is a relatively broad term. One of the electric elements 41 of Ozeki can be considered as "just below" the LD and PD chip 42. Furthermore, Ozeki clearly teaches the concept that the electric elements 41 can be placed on both the top and bottom of a circuit board and the elements can be placed directly over each other on the top and bottom side of the circuit board. The drawings of Ozeki clearly illustrate that part of an electric element 41 is mounted directly below part of another electric element 41.

4. Applicant's other arguments filed January 13, 2006 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Kuhara et al. (U.S. Patent US 6,043,550) disclose a photodiode and photodiode module, wherein the PD is a bottom-incidence type.



6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Quan-Zhen Wang whose telephone number is (571) 272-3114. The examiner can normally be reached on 9:00 AM - 5:00 PM, Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (571) 272-3022. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

qzw  
1/25/2006

  
JASON CHAN  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2600